

1 Woodwork

Lesson One

A Dialogue

Answers

- 1 we (class), us (the class), they (wood carvings)
- 2 Students' answers

Lesson Two

B Listening

Answers

d / g / b / f / c / e / a

Lesson Three

C Vocabulary

Answers

- 1 b / 2 c / 3 a / 4 f / 5 e / 6 d / 7 g

Lesson Four

D Properties and uses

Answers

- 1 a / 2 a / 3 c / 4 a / 5 b

Lesson Five

E Grammar

Answers

- 2 Sentence **a** means that he arrived at his workshop twenty minutes ago and he is still there now, whereas in **b** he stayed in his workshop for twenty minutes and then left.
- 3 Sentence **a** means that they discussed the sample drawings as soon as the carpenter arrived, whereas in **b** they had discussed the sample drawings before the carpenter arrived.
- 4 Sentence **a** means that at the present time he has sent 1000 SYP having previously promised 2000 SYP, whereas in **b** at a time in the past he had sent 1000 SYP and then promised to send 2000 SYP.

Lesson Six

F Reading

Answers

- 1 their: people / it: woodworking / them: mistakes
- 2 It is fun and saves money; students' answers

3 discovering mistakes, correcting them, building up techniques, arranging the tools in order of need

4 Students' answers

Activity Book Answer Key

Unit 1, page 3, exercise 1

a cracked

b broken

c cut

d scratched

e bent

f loose

g twisted

Unit 1, page 4, exercise 2

1 c / 2 d / 3 e / 4 a / 5 b

Unit 1, page 4, exercise 3

1 Did you forget to call the carpenter yesterday?

2 She has already phoned the wood factory manager, so you don't have to speak to him.

3 Does a piece of furniture take plenty of time to be made?

4 Is he using large machines to cut down large trees?

5 When the customer cancelled his order, the carpenters had already made many pieces of furniture.

6 The employees were having lunch when the logs arrived.

Unit 1, page 4, exercise 4

1 in India and Burma

2 because it contains oils which make it as such

3 both; positive for making it water and fire-resistant and negative for making it resistant to adhesive substances

4 a extract

b contains

c desirable

d resistant

Unit 1, page 5, exercise 5

Students' answers

Unit 1, page 5 exercise 6

Students' answers

2 Metalwork

Lesson One

A Dialogue

Answers

- 1 me (Samer), them (the two pieces of metal)
2 Students' answers
3 a True b False; with a brush. c True d True
e False; the last step is heating the metals you want to solder before you apply molten solder to them with the soldering iron.

Lesson Two

B Listening

Answers

- 1 welding sleeves and gloves, a welding helmet, a wire brush, a cable cutter, tip cleaner and a gas cutting torch.
2
a Check that your environment is safe .
b Open the valves of the burner's tank.
c Adjust the pressure to five to eight PSI on the acetyline line and twenty five to forty PSI on the oxygen line.
d Open the acetyline valve.
e Light it with a spark plug.
f Open the oxygen valve on the torch.
g Wait for the flame to turn blue and draw back towards the torch's mouth.
h Modify the flame length.

Lesson Three

C Vocabulary

Answers

3

1 d / 2 h / 3 f / 4 e / 5 c / 6 i / 7 b / 8 a / 9 g

4

a

tools for holding metals: pincers

tools for measuring and marking metals: outside callipers

tools for cutting, shaping and boring metals: hammer

b

tools for holding metals: pliers, spanner, vice

tools for measuring and marking metals: dividers, inside callipers

tools for cutting, shaping and boring metals: chisel, file, hacksaw, drill

Lesson Four

D Characteristics of metals

Answers

Students' answers

Lesson Five

E Grammar

Answers

1 will forge / is

2 receive / will not be

3 arrives / will tell

4 set / is going

5 gets / will find

6 want / will have not gold.

Lesson Six

F Reading

Answers

1 it (vessel), he (operator)

2 It is a container (called a vessel) which is about 10 metres high and about 8 metres in diameter. The vessel is about one metre thick, and has a volume of about 220 cubic metres. It has a hole (called a taphole) on the side, near the top mouth of the container. It is used to make steel.

3 pouring molten iron from a hot iron ladle

4 steel scrap is charged from a scrap box into the mouth of the vessel----> Molten iron is immediately charged directly onto the steel scrap from a hot iron ladle----> Lime flux is poured into the hot metal while an oxygen pipe is lowered to one or two metres above the bottom of the container. ----> the vessel is rotated 90 degrees towards the left for sampling and temperature tests----> A steel ladle is moved under the furnace, the vessel is tilted to the right towards the ladle, and steel is poured out through the taphole.----> the vessel is turned upside down and the waste is tapped into a slag pot

Activity Book Answer Key

Unit 2, page 6, exercise 1

1 melted

2 mixed

3 slag

4 cooled

5 hammered

6 bent

7 cooled

8 heated

Unit 2, page 6, exercise 2

1 d / 2 c / 3 e / 4 b / 5 a

Unit 2, page 7, exercise 3

1 a / 2 a / 3 a / 4 b / 5 c

Unit 2, page 7, exercise 4

1 rocks known as ores; they are filled with important elements, especially metal

2 by chemical processes

3 because they have properties of firmness and endurance

4 They are good conductors of electricity and thus are used in electric appliances.

5 mining: the process or industry of obtaining coal or other minerals from a mine

element: a simple chemical substance that consists of atoms of only one kind

conductor: something that allows electricity or heat to travel along it or through it

endurance: the capacity of something to last or withstand an unpleasant or difficult process or situation without giving way

Unit 2, page 8, exercise 5

Students' answers

Unit 2, page 8, exercise 6

Students' answers

3 Textile Manufacturing

Lesson One

A Dialogue

Answers

- 1 which (the weaving and spinning departments); where (the cotton gin); it (the fibre)
- 2 Students' answers
- 3 cotton is picked from cotton plants -----> seeds are separated from the fibre at the cotton gin -----> the fibre is spun into yarn at the spinning department -----> at the dyeing department, the yarn is dyed to the correct colour -----> the yarn is taken to the knitting department, where it is knitted into fabric

Lesson Two

B Listening

Answers

- | | |
|----------------|------------|
| 1 seeds | 6 thread |
| 2 raw cotton | 7 knitting |
| 3 Spinning | 8 weaving |
| 4 cotton fibre | 9 joined |
| 5 yarn | 10 tightly |

Lesson Three

C Vocabulary

Answers

- | | |
|------------|-------------|
| 1 cleaned | 5 finishing |
| 2 blended | 6 defects |
| 3 weaving | 7 moisture |
| 4 knitting | 8 polishing |

Lesson Four

D Grammar

Answers

- 1 Textiles, which vary in nature, are used for many purposes.
- 2 Silk, which is a delicate kind of a textile, is often used in China.
- 3 Your open reception serves several purposes, examples of which are to welcome the public and friends, deepen the viewers' experience of the types of textiles and make connections between the tailor and the community.
- 4 Cotton textiles, which are comfortable to wear, are extensively used to make daily clothing.

Lesson Five

E Reading

Answers

- 1 Students' answers
- 2 it's (textile manufacturing); These (textiles)
- 3 Four: weaving, knitting, braiding and bonding
- 4 unconventional
- 5 Students' answers

Activity Book Answer Key

Unit 3, page 9, exercise 1

4 - 3 - 2 - 1

Unit 3, page 9, exercise 2

- 1 still
- 2 yet
- 3 still
- 4 still
- 5 anymore

Unit 3, page 10, exercise 3

- 1 Students' answers
- 2 a True
b True
c False
d False
- 3 ironing board, whisk broom, tailor's brush, press cloth, hot iron, holder stand
- 4 so that both hands are free to change the press cloth and this reduces the danger of burning the material

Unit 3, page 11, exercise 4

Students' answers

Unit 3, page 11, exercise 5

Students' answers

Review (Unit 1 – 3)

A

1 f / 2 a / 3 d / 4 c / 5 b / 6 e / 7 h / 8 g

B

1 d / 2 a / 3 e / 4 b / 5 c

C

1 furniture 2 exhausting 3 skills 4 strategies 5 plans 6 safety
7 budgeting

D

For building he must

- 1 sketch whatever he is going to build on a paper.
- 2 make a list of the required tools.

For safety he must

- 1 wear safety glasses.
- 2 avoid wearing baggy clothes.
- 3 not eat or smoke while working.
- 4 keep the room ventilated.
- 5 be cautious while working with the tools.

For improving his woodwork he must

- 1 discover his mistakes.
- 2 correct them.
- 3 build up techniques.
- 4 be organised.

E

1 hard 2 malleable 3 ductile 4 fusible 5 conductive

F

3 / 1 / 2 / 5 / 4 / 6

G

printing / dyeing / knitting / weaving / spinning departments

H

1 visit 2 are 3 demonstrated 4 was carving, slipped, hurt 5 has been

I

First you should choose a good piece of watercolour paper. Then you sketch your drawing lightly. Next, if you need to use watery paint for large areas, you should wet the paper with water. When you finish painting the large areas, you must catch any drips. Next, if you need to paint any details, you should use a drier brush. As soon as the painting dries completely, you will be able to mount your picture.

J

- 1 Textile manufacturing, which is based on the conversion of three types of fibre into yarn, then fabric, then textile, is a major industry.
- 2 The traditional method of manufacturing fabric, which depends on weaving, knitting and braiding, is rarely used.
- 3 Dr Jill, whom I met last week, will teach carpentry.
- 4 Mr Samer, who was a competent guide, explained all the necessary steps involved in manufacturing textiles.

Test 1 Answer Key

I

- 1 strength, versatility, luxurious softness
- 2 because it has antimicrobial properties, satin feel, is warmer in winter and cooler in summer, non-irritating to skin, has superior absorption quality
- 3 Yes, because chemical processes are used, which pose threats to workers and to the environment around the processing faculties.
- 4 unparalleled: bigger, better or worse than anything else
non-irritating: harmless
reveal: to show something that was previously hidden
absorbent: able to take in water easily
convert: change something into a different form

II

- 1 textile
- 2 absorbent
- 3 made from
- 4 recycled
- 5 blend
- 6 ginned
- 7 cottonseed
- 8 refining

III

Students' answers

IV

- 1** had studied, went
- 2** finished
- 3** was living; worked
- 4** received
- 5** is working
- 6** will travel

V

- 1** Alan, who did not come to class yesterday, explained his absence to the teacher.
- 2** Jack, who speaks Russian, applied for the job.
- 3** no need for commas
- 4** We enjoyed Damascus, where we spent our vacation.
- 5** no need for commas

VI

Students' answers

4 Maintenance of motors and engines

Lesson One

A Dialogue

Answers

1 It (mileage), it (engine oil), it (brake pedal)

2-3 Students' answers

Lesson Two

B Listening

Answers

3 / 7 / 8 / 4 / 6 / 2 / 1 / 5

Lesson Three

C Vocabulary

3

Answers

1 d / 2 a / 3 g / 4 b / 5 c / 6 e / 7 f

4

Answers

1 automobile: a road vehicle

2 corrosion: damage caused by the gradual destruction of metal by the effect of water, chemicals, etc.

3 radiator: the part of a car or aircraft which stops the engine from getting too hot

4 invoice: a bill

5 supervise: observe and direct the work of (someone)

5

Answers

1 do 2 were made 3 did 4 was made 5 done 6 made

Lesson Four

D Grammar

6

Answers

2 Safety hats should be worn in the garage.

3 This invoice has to be paid before the end of the month.

4 The damaged cars could be seen.

- 5 The engine must be repaired at once.
 6 The damaged car parts had to be thrown away.
 7 The motorcycle will be repaired within a week.
 8 Those four containers are going to be sent by rail.

7

Answers

2 Passive 3 Active 4 Active 5 Passive

Lesson Five

E Reading

Answers

Team 1	Team 2	Team 3	Team 4	Team 5
(new tyres)	(wheel nuts)	(jacks)	(fuel)	(old tyres)
a bring out new tyres	a loosen wheel nuts	a place the front and rear jacks under the car	a Bring the fuel hose	a Take off the old wheels
b adjust tyre pressures	b step back quickly	b raise the car off the ground	b Push the nozzle into the fuel socket	b Take away the old wheels
c wait	c wait	c step back quickly	c Pump the fuel into the car	
d put the new wheels on	d tighten the wheel nuts	d wait	d raise their hands	
e step back	e raise their hands	e lower the car to the ground		
		f take the jacks away		

Lesson Six

F Writing

Answers

Students' answers

Activity book Answer keys

Unit 4, page 14, exercise 1

A

1 fuel 2 radiator 3 Batteries 4 exhaust 5 engine

B

Students' answers

Unit 4, page 15, exercise 2

Students' answers

Unit 4, page 15, exercise 3

A

- 1 It can be said that cleanliness of electric motor operation and maintenance is largely a matter of prevention than correction.
- 2 While in operation, the belt drive must be inspected periodically for any improper tension.
- 3 The alignment of the sheaves should also be checked and inspected.
- 4 Electrical connections and conductors must also be inspected for proper insulation security from time-to-time.
- 5 A useful and deadly force of energy can be carried by this machine.
- 6 To reduce combustion temperature, the exhaust gas should be sent back into the cylinders.

B

- 1 Compared to carbon-based fuels, good acceleration may be given by electric cars.
- 2 Heat will be developed by diesel engines when a mixture of compressed fuel and air are burned inside a cylinder.
- 3 Because of the danger of working with electric motors, safety precautions should be observed by people.
- 4 Ventilation can be reduced by dirt inside the electric motor.

Unit 4, page 16, exercise 4

- 1 when the level of fuel in the tank is very low
- 2 when the level of the fuel falls, the float moves downwards. When this happens, the arm also moves downwards and makes the lever touch an electric contact.
- 3 the driver should put petrol into the tank
- 4 a warning b switches on c level d rises e fuel

Unit 4, page 16, exercise 5

Students' answers

Unit 4, page 16, exercise 6

Students' answers

5 Maintenance of Home Appliances

lesson One

A Dialogue

Answers

- 1 her washing machine
- 2 It's not running properly.
- 3 the lid is not closed tightly or the washing machine is overloaded
- 4 to put lighter loads and to wait around 15 minutes between loads for the motor to rest

lesson Two

B Listening

Answers

- 3 a / 4 b / 2 c / 6 d / 1 e / 5 f / 7 g Constantly use antivirus software to protect your computer.

lesson Three

C Vocabulary

Answers

- 1 air conditioning
- 2 washing machine
- 3 dryer
- 4 oven
- 5 refrigerator
- 6 microwave
- 7 blender

lesson Four

D Grammar

Answers

- 1 Ahmad asked me if the maintenance employees were working efficiently.
- 2 Jason wanted to know who sent / had sent the laptop for maintenance.
- 3 Robert asked me if Tim was trying to fix the air conditioning.
- 4 Hind asked me if they would provide them with maintenances services the next day.
- 5 Rima wanted to know where we sent our home appliances to be repaired.
- 6 Nancy wanted to know why Nick didn't send / hadn't sent the broken TV back to the store.
- 7 Huda asked me where the best maintenance stores in town were.

8 Linda asked me if my mum flew / had flown to London two weeks ago.

9 A man asked me when the handyman arrived.

lesson Five

E Reading

Answers

1 No; they install and repair appliances; they drive to the location of the equipment; they show the customer how to use the appliance and answer questions about maintaining it; their knowledge and skills should be constantly updated regarding new models

2 in order to repair the latest appliances

3 a repair: fix

b installing: placing (equipment or machinery) in position ready for use

c maintaining: keep a machine in good condition or in working order by checking or repairing it regularly

d inspect: examine; check

lesson six

F Writing

Answers

student's answers

Activity book Answer keys

Unit 5, Page 17, Exercise 1

a (10 / 6 / 4 / 3 / 2); b (10 / 9 / 6 / 3); c (10 / 9 / 6 / 3 / 2); d (10 / 9 / 8 / 6 / 5 / 4 / 2);

e (10 / 6 / 4 / 3 / 2); f (10 / 9 / 6 / 3); g (10 / 9 / 6 / 3 / 2); h (10 / 6 / 3 / 2);

i (10 / 6 / 2); j (10 / 6 / 4 / 2);

Unit 5, Page 17, Exercise 2

Student's answers

Unit 5, Page 18, Exercise 3

1 Khaled wanted to know how he could learn about maintaining home appliances.

2 Ruba asked how to keep her appliances safe during thunderstorms.

3 The manager wanted to know who could take care of his broken TV.

4 Amer asked me if I could finish restoring his laptop by the next day.

5 Hani wanted to know if it was possible to identify the reason why the radio kept breaking down.

Unit 5, Page 18, Exercise 4

1 it: battery

I: Ali Gaafar

you: Telco Phone Co

2 physical barriers such as concrete walls

3 A

4 from a room where the signal cannot be received because the phone may not be able to transmit or receive a signal when obstructed by physical barriers.

Unit 5, Page 18, Exercise 5

Student's answers

Unit 5, Page 18, Exercise 6

Student's answers

6 Installation of lifts & Escalators

lesson One

A Dialogue

Answers

- 1 He installs and repairs lifts.
- 2 His job is stable because it relies on maintenance and repair.
- 3 **a** They have different jobs
b A lift installer's job relies on maintenance and repair.

lesson Two

B Listening

Answers

- 1 pump and reservoir
- 2 small family residences
- 3 compartment
- 4 cable
- 5 above the lift shaft

lesson Three

C Vocabulary

Answers

- 1 e / 2 f / 3 a / 4 d / 5 b / 6 g / 7 c

lesson Four

D Grammar

Answers

4

- 2 I don't believe Tom has had much experience in installing escalators.
- 3 I don't propose we should look for a new employee who has more experience in repairing lifts.
- 4 I don't believe we could always ask for a different manager.
- 5 I don't expect they would agree to this in the middle of a critical state of sales.
- 6 I don't think they would understand our position.

5

- 2 Requesting. Mike asked Laila not to leave the escalators working after 6 p.m.
- 3 Advising. Susie advised Alice to take the lifts instead of the stairs. She thought that Alice would save some time and energy.
- 4 Reminding. Ali reminded Jane to press the alarm button if the lift suddenly stopped.
- 5 Warning. Huda warned Ali not to go down an ascending escalator.

- 6 Encouraging. Khaled encouraged me to install more escalators in the shopping centre.
7 Requesting. Samer asked Liz not to go into an overcrowded lift.

lesson Five

E Reading

Answers

- 1 technical fields: electronics, mechanics, computers
2 Lifts installers should have a lot of knowledge and skills.
3 Students' answers
4 **a** requires / **b** fluid / **c** apprenticeship / **d** properly

lesson Six

F Writing

Answers

Students' answers

Activity book Answer keys

Unit 6, Page 20, Exercise 1

1 a / 2 d / 3 b / 4 c / 5 a

Unit 6, Pages 20-21, Exercise 2

A

- 1 He does not think that this escalator is well installed.
- 2 I don't believe the public might be aware that the lifts are still out of service.
- 3 I don't expect that installing escalators will reduce the number of customers who will use the stairs.
- 4 I believe that even though we had the best experts on installing lifts, we would still face maintenance problems and complaints from customers.

B

- 1 advising
- 2 warning
- 3 encouraging
- 4 reminding
- 5 requesting

Unit 6, page 21, exercise 3

- 1 the role of control panels in the installation of a lift
- 2 a lift installer
- 3 The panel should provide the available choice the passenger can make; it should be able to allow the individual to signal his choice; it should be able to confirm the choice made with a certain type of feedback.
- 4 a device set with buttons that designate the floors that the cabin can stop at

Unit 6, page 22, exercise 4

Students' answers

Unit 6, page 22, exercise 5

Students' answers

Review (Unit 4 – 6)

A

1 b / 2 g / 3 j / 4 a / 5 e / 6 i / 7 c / 8 f / 9 h / 10 d

B

Answers may vary

C

minor: 1 / 3 / 5 / 6

major: 2 / 4 / 7 / 8

D

1...the car won't start.

2...you can't see.

3...you've got a flat tyre.

4...it looks old and rusty.

E

Team 1: They adjust the tyre pressure and later put the wheels on the car.

Team 2: They loosen the wheel nuts, then tighten them using wheel guns.

Team 3: They raise the car off the ground with front and rear jacks, then lower it down after the new wheels are put.

Team 4: They pump fuel into the car.

Team 5: They take the old tyres off and move them away.

Teams 2 and 4: raise their hands after finishing their tasks.

F

1 False, very demanding / 2 True / 3 False, repairing and installing

4 True

G

Top floor, Lift shaft, Electronic hoist motor, Lift pit, Machine room, Hoist cable, Cabin

H

Answers may vary.

I

1 made / 2 made / 3 do / 4 Doing / 5 done

J

- 1 An appointment will be made by Salah to have his car serviced.
- 2 Water can't be put in the radiator when it is steaming.
- 3 Minor and major car services must be supervised by professional mechanics.
- 4 A racing car can be serviced by mechanics in less than ten seconds.

K

- 1 Active / 2 Passive / 3 Passive / 4 Active / 5 Active

L

- 1 The doctor advised the patient to eat healthy food and exercise daily. (action)
- 2 Their teacher reminded them to study well for the test. (action)
- 3 The teacher told the students that they had to go over the information several times. (information)
- 4 Nora told the teacher that she would like to use the dictionary during the test. (information)
- 5 The repairman warned the lady not to touch anything because she might damage the microwave. (action)

M

Answers may vary

Sample Test 2 Answer Key

I

- 1 Students' answers
- 2 Their: technicians; they: old parts; their: cars
- 3 a execute: carry out; accomplish
b inspection: check-up; examination
c evolved: developed
d requires: needs

II

- 1 connecting
- 2 leaks
- 3 site
- 4 failure
- 5 noises
- 6 vibration
- 7 loose
- 8 disassemble
- 9 internal

III

Students' answers

IV

- 1 He asked where the meeting would take place.
- 2 The authorities asked why the plane had landed at a different airport.
- 3 The teacher asked who could draw this picture.
- 4 He asked who was going to be nominated vice president / He asked who the nominated vice president was going to be.

V

- 1 do
- 2 making
- 3 made
- 4 do

VI

- 1 Incorrect. The phone will be answered automatically..
- 2 Correct
- 3 Incorrect: My essay must be written today.
- 4 Incorrect: The medication should be stopped if it begins to produce side effects.

VII

Students' answers

7 Moulding Metals

lesson One

A Dialogue

Answers

- 1 c
- 2 a
- 3 d
- 4 b

lesson Two

C Vocabulary

Answers

- 1 Feedstock
- 2 Green part
- 3 Binder
- 4 brown part
- 5 Metal injection moulding (MIM)
- 6 Freeze
- 7 Solvent
- 8 Furnace.

D Grammar

Answers

- 1 knew
- 2 were / was
- 3 didn't take
- 4 won
- 5 cooperated
- 6 had
- 7 were / was

lesson Three

E Preferences and comparisons

7

Answers

- 3 Specific
- 4 General
- 5 Specific
- 6 General
- 7 Specific
- 8 Specific

8

Answers

Answers vary

Lesson Four

F Buying a product

Answers

Answers vary

Lesson Five

G Reading

Answers

- 1 Sand Casting
- 2 Plaster Mould Casting
- 3 Shell Moulding
- 4 Die Casting
- 5 Investment Casting (or lost Wax Casting)
- 6 Centrifugal Casting
- 7 Semi-Solid Metal Casting.

Questions

- 1 **a** Cheap
b Centrifugal Casting
c Die Casting
- 2 Because the parts are initially made of wax
- 3 The sand is bonded using clay or chemical binders.
- 4 **a** Centrifugal Casting
b Die Casting
c Shell Casting
d Sand Casting
e Semi-Solid Metal Casting

Activity book Answer keys

Unit 7, page 25, exercise 1

- 1 d
- 2 f
- 3 e
- 4 a
- 5 c
- 6 b

Unit 7, page 25, exercise 2

A

- 1 If you had a batch of feedstock, you could use it to make some metal parts.
- 2 If something went wrong with the metal moulding machine, the factory would call a technician for help.
- 3 If it were cost-effective and time saving, you would talk to the manager of a large established metal moulding company.
- 4 If I had the necessary equipment, I would make a new seat post for my bike.
- 5 If you could produce a set of small metal parts locally, there would be a metal moulding company in your area.
- 6 If I were you, I would buy a bigger quantity of keys.

B

- 1 Would choose being a blacksmith.
- 2 Made the product instead of buying it.
- 3 If we didn't decide, to renovate the hotel, we wouldn't buy new keys

Unit 7, page 26, exercise 4

- 1 The 3D metal printing produces high quality metal parts at the fraction of the cost of current technology as well as it can make the exact quantity a company needs and it saves money, time and resources.
- 2 effective, replace, can make, save, can manage, require, able.
- 3 - Intricate: counting a lot of small parts or details that all work or fit together
 - Fraction: a very small amount of something.
 - Bulk: buying goods in large quantity at one time.
 - Artificial intelligence: The study of how to make computers do intelligent things that people can do such as thinking and making decisions.
- 4 Answers vary.

8 Arc Welding

Lesson One

A Dialogue

Answers

- 1 process of joining two metals
- 2 arc welding
- 3 because it's easy and not very expensive

Lesson Two

B Listening

Answers

- 1 False; coated electrodes helped to control the electric arc.
- 2 False; besides the British inventors, a Russian inventor was also responsible for the arc welding development.
- 3 False; during the two wars, the popularity of arc welding rose.
- 4 False; in the 1950s, new improvements to the welding process helped make it automatic.
- 5 True

Lesson Three

C Vocabulary

Answers

3

a 3 / b 6 / c 2 / d 5 / e 1 / f 4

4

- 1 welding
- 2 expensive
- 3 electric
- 4 fused

Lesson Four

D Grammar

5

Answers

- 1 He wouldn't have discovered the arc if he hadn't observed and experimented. / He would have discovered the arc if he had observed and experienced.
- 2 If we had had electricity, we could have mended the ship.
- 3 I wouldn't have lost my money if I hadn't used expensive ways to join metals together. / I would have lost my money if I had used expensive ways to join metals together.

- 4 If the metal hadn't been so weak, the bridge wouldn't have collapsed. / If the metal had been so weak, the bridge would have collapsed.
- 5 I couldn't have held it together if the steel had needed welding at the joint. / I could have held it together if the steel had not needed welding at the joint.

6

Answers

Students' answers

Lesson Five

E Reading

7

Answers

- 1 Students' answers.
- 2 Direct (DC) or alternating (AC) current can be used for the welding power supply.
- 3 because more modern ways of welding have been discovered
- 4 Students' answers

Lesson Six

F Writing

Answers

Students' answers

Activity Book Answer Key

Unit 8, page 28, exercise 1

- 1 metal
- 2 welding
- 3 fuse
- 4 current
- 5 filler

Unit 8, page 28, exercise 2

- 1 What does my safety gear consist of?
- 2 After I have put on all my protective gear, will I be ready to get to work?
- 3 Your job here is to fuse metals together using a technique we call welding.
- 4 It is when we melt metal to fuse it using an arced current of electricity.
- 5 This will help protect your work so that it lasts longer.

Unit 8, page 29, exercise 3

A

- 1 had had
- 2 had shared
- 3 would have led
- 4 had used

- 5 had organised
- 6 would have suffered

B

Students' answers

Unit 8, page 29, exercise 4

- 1 because welders can face certain dangers
- 2 overalls, goggles, welding helmet with a flash filler, steel-capped boots
- 3 by constant inspection and maintenance, electrical safety, proper ventilation to reduce fire or explosion risks

Unit 8, page 30, exercise 5

Students' answers

Unit 8, page 30, exercise 6

Students' answers

9 Refrigeration

Lesson One

A Dialogue

Answers

- 1 Students' own answers
- 2 the head pressure
- 3 because the leak will continue if the coil, the leaking part, is only fixed.

Lesson Two

B Listening

Answers

- 1 climate
- 2 cellars
- 3 artificial
- 4 practical
- 5 temperature
- 6 patented

Lesson Three

C Vocabulary

Answers

- 1 compressor 2 condenser 3 receiver 4 liquid line filter drier
- 5 sight glass 6 evaporator 7 system

Lesson Four

D Grammar

Answers

- 1 doesn't it? 2 does it? 3 hasn't he? 4 did he? 5 wouldn't they
- 6 aren't they? 7 can't you? 8 have they? 9 won't they? 10 did they?

Lesson Five

E Reading

Answers

- 1 food safety
- 2 maintain temperature of refrigerator at 4.4°C or below; place and package food properly; clean refrigerator
- 3 Students' answers
- 4 Students' answers
- 5 a perishable b optimal c contamination d raw

Lesson Six

F Writing

Answers

Students' answers

Activity Book Answer Key

Unit 9, paged 31-32, exercise 1

A

Students' answers

B

- 1 spoil
- 2 condenser
- 3 refrigerator
- 4 freezer
- 5 bacteria
- 6 ice
- 7 temperature
- 8 food
- 9 evaporator

Unit 9, page 33, exercise 2

- 1 isn't it
- 2 do they
- 3 hasn't she
- 4 did he
- 5 can't they
- 6 aren't they

Unit 9, page 33, exercise 3

- 1 Students' answers
- 2 Foods that spoil quickly could not be preserved; a lot of food would go to waste.
- 3 Students' answers
- 4 Students' answers
- 5 **a** the art of designing something new
b go bad, rot
c disadvantage
d to use up
e unable to do without

Unit 9, page 33, exercise 4

Students' answers

Review (Unit 7 – 9)

A

1 e / 2 a / 3 i / 4 c / 5 g / 6 b / 7 h / 8 d / 9 f / 10 j

B

- 1 vital
- 2 medical
- 3 detect
- 4 wavelength
- 5 dense
- 6 bones
- 7 absorb

C

Answers vary

D

Answers vary

E

Answers vary

F

- 1 true
- 2 false; we do see them on a day to day basis.
- 3 false; computer manufacturers are responsible for protecting the environment.
- 4 true

G

- 1 he wouldn't work.
- 2 would choose
- 3 would still be
- 4 had
- 5 would love
- 6 would use
- 7 would have uploaded
- 8 were / was
- 9 would have consulted
- 10 would design

H

- 1 If I had bought a computer last year, I would have exchanged it for a laptop.
- 2 If Alia weren't / wasn't a nurse, she would like being a doctor more.
- 3 If I had learned how to use x-ray machine, I would have taken radiographs of peoples' body parts.
- 4 If the x-ray machine had broken down, we would have called the head radiographer immediately
- 5 If industries had needed to work more quickly, they would have invented Robots.

- 6 If Robots hadn't minimized the amount of repetitive jobs humans need to do, people wouldn't have started/wanted to do more interesting jobs. (there are other alternatives)
- 7 If industries had been concerned about the danger of working in certain environment, they would have created robots to do the jobs instead.

I

- 1 don't we?
2 aren't I?
3 don't you?
4 doesn't it?
5 isn't it?
6 *does it?*
7 *shouldn't they?*

Sample Test 3 Answer Key

I

- 1 Emily's invention was a portable fridge.
2 The fridge is ideal in many parts of Africa because people can build it using old car parts and other objects from their home.
3 She went to Africa to work on her design.
4 She didn't sell her fridge design because she decided not to produce the fridge for profit. (we may add that; and people can produce their own portable fridges from her instructions).
5 Answers vary.
6 Answers vary.

II

- 1 inventor
2 refrigeration / refrigerator
3 electricity
4 long
5 amazing
6 daily
7 healthier

III

Answers vary

IV

- 1** If you go to the factory, you will see plenty of robots in action (first conditional)
- 2** My dad would have asked for help if he had known about computer hardware (third conditional)
- 3** If you bought a new laptop, I would teach you how to use it (second conditional).
- 4** If you had come to class today, you would have seen the humanoid robots (third conditional).
- 5** you would learn how to fix an internet connection problem if you took the course with me (second conditional)

V

- 1** didn't he?
- 2** aren't you?
- 3** are they?
- 4** has he?
- 5** shouldn't they?

10 Automatic Control

Lesson One

A Dialogue

Answers

- 1 A shower head
- 2 He already has a shower head.
- 3 **a** False, automatically controlled shower head
b True
c True
d False, it is more expensive.

B Listening

Answers

- 1 have become very important.
- 2 electrical, mechanical and chemical matters.
- 3 automatic toaster, the washing machine and dryer, computers and robots.

Lesson Two

C Vocabulary

Answers

- 1 automatically / 2 manual / 3 control systems / 4 processes / 5 response

Lesson Three

D Grammar

Answers

- 1 everything / 2 Nobody, No one / 3 somewhere / 4 Anyone / 5 Nothing
6 nowhere, somewhere / 7 something / 8 something / 9 somewhere

Lesson Four

E Speaking

Answers

Students' answers

Lesson Five

F Reading

Answers

1

Ancient World: People used to organise a functional system based on water and level work to make jobs, like pulling up a wooden gate, easier.

17th century: Systems developed into designs to control the temperatures and the mechanics of mills and steam engines.

19th century: Control systems were modified to stabilise and steer ships and planes.

1930s and on: Control systems began to develop into automatic processors.

2 a iii the ancient world

b ii Automatic

c ii level work

Lesson Six

G Writing

Answers

Students' answers

Activity Book Answer Key

Unit 10, page 36, exercise 1

1 d / 2 c / 3 d / 4 a / 5 b

Unit 10, page 36, exercise 2

1 automatic

2 linear

3 operation, minimal

4 advances

Unit 10, page 37, exercise 3

Students' answers

Unit 10, page 37, exercise 4

A

1 All

2 everyone / everybody

3 Both

4 One

5 somewhere

6 everybody / everyone

7 anything

8 any

B Students' answers

Unit 10, page 38, exercise 5

1 Control systems have made human life easier.

2 measurement, comparison, computation and correction

3 Students' answers

Unit 10, page 38, exercise 6

Students' answers

11 Electrical Power Stations

Lesson One

A Dialogue

Answers

- 1 Thomas Edison is the inventor who built the first power stations; he is interested in power stations because he wants to know how the first power station, which he built in 1882, has developed.
- 2 types of energy sources have improved; power stations use gas, oil, coal and fuels; power stations produce electricity through heat, water, wind and the sun's heat.
- 3 Students' answers

Lesson Two

B Listening

Answers

- 1 water / 2 turbine / 3 generator / 4 cooling water / 5 condenser / 6 pump

Lesson Three

C Vocabulary

Answers

Students' answers

Lesson Four

D Grammar

Answers

- 1 d / 2 a / 3 b / 4 a / 5 c / 6 d / 7 b / 8 d / 9 c / 10 d

Lesson Five

E Reading

Answers

- 1 partner: colleague
steam: water vapour
supply: provide
overhead: above the level of the head
develop: progress
form: kind or type
- 2 Thomas Edison and Edward Johnson, in 1882
- 3 It was powered by a steam engine and provided electricity for the area around it through water pipes without digging up the ground.
- 4 Students' answers
- 5 a last: first / b destroyed: built / c took away: supplied / d consume / use up: generate

Lesson Six

F Writing

Answers

Students' answers

Activity Book Answer Key

Unit 11, page 39, exercise 1

1 hydraulic / 2 solar / 3 generator / 4 turbine / 5 electricity

Unit 11, pages 39-40, exercise 2

A 1 on; to / 2 for / 3 of / 4 before / 5 at / 6 in / 7 by / 8 across

B Our school took us on a trip to the city's power station. We went by bus, since the distance was too far to walk. There, we saw how electricity was produced and then distributed around the city. We went into one of the control rooms and observed the technicians at work. After we saw the control room, we then went to learn how the generators of the station worked. The turbines were moved by water or wind currents.

Unit 11, page 40, exercise 3

1 Students' answers

2 thermal: electrical power is generated by heat

water: electricity is produced through dams

sun: solar panels change sunlight into electricity

wind: wind turbines create electricity in wind power plants

3 It needs to be located in areas with strong, steady winds; to be strong enough to generate electricity by wind power plants

4 a thermal (energy derived from heat) ; b power station (place where electricity is generated); c solar (energy derived from the sun's rays); d dams (reservoirs that store water)

Unit 11, page 41, exercise 4

Students' answers

12 Latest Discoveries

Lesson One

A Dialogue

Answers

- 1 what they consider to be the most important discovery in history
- 2 vaccines; electricity; radio waves
- 3 very bad
- 4 Students' answers
- 5 Students' answers

B Listening

Answers

- 1 b / 2 a / 3 a / 4 c / 5 b

Lesson Two

C Vocabulary

Answers

- 1 mechanical / 2 commercially / 3 production / 4 converting
5 electrical / 6 integrate / 7 continuously

D Matching

Answers

- a 7 / b 6 / c 5 / d 4 / e 2 / f 8 / g 1 / h 3

Lesson Three

E Grammar

5

Answers

- 1 F / 2 RO / 3 CS / 4 F / 5 CS / 6 RO / 7 CS / 8 F / 9 RO / 10 CS

6 and 7

Answers

6 and 7

Students' answers

Lesson Four

F Speaking

8 and 9

Answers

Students' answers

9

Answers

Students' answers

Lesson Five

G Reading

Answers

Students' answers

Lesson Six

H Writing

Answers

Students' answers

Activity Book Answer Key

Unit 12, page 42, exercise 1

1 painful / 2 invention / 3 safely / 4 extremely / 5 simultaneously
6 practical / 7 affordable / 8 recharge

Unit 12, page 42, exercise 2

Students' answers

Unit 12, page 43, exercise 3

A

a fragment / b fragment / c run-on / d run-on / e fragment
f fragment / g fragment / h fragment / i run-on / j run-on

B

Students' answers

Unit 12, page 43, exercise 4

advert 1 h / b / a / d / g

advert 2 c / f / e / i

Unit 12, page 44, exercise 5

1 Students' answers

2 a 4 / b 1 / c 5 / d 2 / e 3

3 It works without panels and draws power from the air. It's cheap.

4 Old solar systems use parts some of which are expensive, dangerous and heavy.

5 Students' answers

Unit 12, page 44, exercise 6

Students' answers